WHAT IS CLAIMED IS:

1.   An electronic control apparatus which incorporates a floating-point arithmetic function and performs various types of calculation and control operations in accordance

5   with a predetermined computer program, comprising

conversion means for operating on map data that comprise a set of map points and a set of map values respectively corresponding to said map points, to convert at least one of said set of map points and set of map

10   values from fixed-point representation to floating-point representation.

2.   An electronic control apparatus according to claim 1, wherein said map points are expressed in floating-point

15   representation in said map data and said map values are expressed in fixed-point representation in said map data, and wherein data expressing said set of map values are of smaller amount that data which express said set of map points.

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3.   An electronic control apparatus according to claim 1, wherein said map points are expressed in fixed-point representation in said map data and said map values are expressed in floating-point representation in said map data,

25   and wherein data expressing said set of map values are of

greater amount than data which express said set of map points.

4.   An electronic control apparatus according to claim 1, wherein said map data and said map values are both expressed in fixed-point representation in said map data, and wherein said conversion means performs conversion of both said map points and said map values from fixed-point representation to floating-point representation.

5.   An electronic control apparatus according to claim 3 wherein said map values indirectly express respective physical quantity values, and comprising means for providing a LSB conversion value that is expressed in floating-point representation and represents a physical quantity value that has been predetermined as corresponding to a least significant bit of said fixed-point representation data, wherein

said map conversion means generates floating-point data expressing a value of a physical quantity corresponding to an interpolated value of said map values by using said data converted to floating-point representation in conjunction with said LSB conversion value.

6.   An electronic control apparatus according to claim 5
wherein said conversion means derives said floating-point
representation value of a physical quantity corresponding
to an interpolated value of said map values, by

5   successively

operating on said converted floating-point
representation data expressing said map values to calculate
an interpolated value of said map values, and

using said LSB conversion value to operate on said

10   interpolated value, to obtain said physical quantity value
corresponding to said interpolated value.

7.   An electronic control apparatus according to claim 6
comprising means for providing data expressing an offset

15   value that has been predetermined as corresponding to said
map data, wherein said interpolated value is obtained as a
logical value, and wherein conversion means

operates on said logical value with said LSB
conversion value, to obtain a provisional value of said

20   physical quantity corresponding to said interpolated value,
and

adds said offset value to said provisional value, to
obtain said floating-point representation value of a
physical quantity corresponding to said interpolated value.

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8.   An electronic control apparatus according to claim 3,
comprising means for providing a LSB conversion value that
is expressed in floating-point representation and
represents a physical quantity value that has been
5   predetermined as corresponding to a least significant bit
of said fixed-point representation data, wherein said
conversion means utilizes said LSB conversion value and
said map value data converted to floating-point
representation to obtain a physical quantity value
10   corresponding to said map point data and expressed in
floating-point representation.

9.   An electronic control apparatus according to claim 8,
comprising means for providing data expressing an offset
15   value that has been predetermined as corresponding to said
map data, wherein said conversion means obtains said
interpolated value as a logical value, and wherein
conversion means

operates on said interpolated value with said LSB
20   conversion value, to obtain a provisional value of said
physical quantity corresponding to said interpolated value,
and

adds said offset value to said provisional value, to
obtain said floating-point representation value of a
25   physical quantity corresponding to said interpolated value.

10. An electronic control apparatus according to claim 1, comprising means for providing ID data which express a type of said fixed-point representation data, wherein said

5 conversion means performs conversion of said floating-point representation data to said fixed-point representation data based on said ID data.

11. An electronic control apparatus according to claim 1,

10 wherein said conversion means executes said conversion by using a program that is written in assembler language.

12. An electronic control apparatus according to claim 1, comprising

15   means for providing ID (identifier) data which have been predetermined as corresponding to said map data and which indicate whether or not both said map points and said map values of said map data are expressed in floating-point representation, and

20   means for inhibiting said conversion operation of said conversion means when said ID data indicate that both said map points and said map values are expressed in floating-point representation.

13. A memory apparatus for an electronic control apparatus, said electronic control apparatus executing various types of calculation and control processing in accordance with a predetermined program and having a floating-point

5   arithmetic function, and said memory apparatus having stored therein map data which are used in floating-point calculations,

    wherein said map data include a set of map points and a set of map values that respectively correspond to said

10   map points, with at least one of said set of map points and said set of map values being expressed by fixed-point representation data, and wherein said memory apparatus has stored therein, in conjunction with said map data, a LSB conversion value that is expressed in floating-point

15   representation and represents a physical quantity value that has been predetermined as corresponding to a least significant bit of said fixed-point representation data.

    14.   A memory apparatus for an electronic control apparatus

20   according to claim 13 wherein said memory apparatus has stored therein, in conjunction with said map data, an offset value that is a difference between a physical quantity value and a value that has been generated by converting said fixed-point representation data to

25   floating-point representation data and using said LSB

conversion value to operate on a result of an interpolation calculation performed on said converted floating-point representation data.

5   15.   A memory apparatus for an electronic control apparatus according to claim 13, wherein said memory apparatus has stored therein, in conjunction with said map data, ID (identifier) data indicative of a type of said fixed-point representation data.

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16.   A memory apparatus for an electronic control apparatus according to claim 13, wherein said memory apparatus has stored therein said map data with both said map points and said map values being expressed by floating-point

15   representation data and further has stored therein, in conjunction with said map data, ID (identifier) data indicative of the condition that said map points and map values are both expressed in floating-point representation data.